IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Serial No. 09/936,531   Group: 1746

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For   Centrifugally atomized zinc alloy powder for alkaline batteries

Commissioner for Patents
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DECLARATION UNDER 37 C.R. 1.132

I, Christophe Henninot, declare as follows.

1. I am a technical member of the scientific team that has developed the centrifugal atomization process for zinc powders within the company Umicore and has filed a demand for patent towards the US patent office.

2. A study was conducted under my direction and guidance to compare the gassing properties of zinc powders made with different alloys and different processes.
   - 2 alloys were chosen from the compositions covered by WO94/19502 (WO'502): 30ppm Al 100ppm Bi and 100ppm Al 100ppm Bi 180ppm Ca. These compositions are outside the ranges claimed in the application 09/936,531. They were produced by both gas atomization and centrifugal atomization at 3.25% O2, (as disclosed in application 09/936,531).
   - 2 alloys were chosen from the compositions covered by JP1-52379 (JP'379): 500ppm Pb 500ppm Al 500ppm Ni and 500ppm Pb 500ppm Mg 500ppm Ni. They were produced by both gas atomization and centrifugal atomization at 3.25% O2 (as disclosed in application 09/936,531), and amalgamated afterwards, as described in JP'379.

3. Gassing tests before discharge were taken from WO 97/31397 (WO'397). The data in the Table 1 below clearly show that the alloys covered by WO'502 and JP'379 are not acceptable to make a good zinc powder for alkaline battery (customer specifications for gassing before discharge nowadays are below 6μl/g/d). Moreover, the data in the Table 1 also clearly show that compared to gas atomization at 3.25% O2, the centrifugal atomization process does not improve the properties of the zinc powders, both for the alloys covered by WO'502 and JP'379, contrary to the results obtained for the present application.

Table 1: Gassing before discharge measurements (expressed in µl/g/d) for alloys taken from JP'379, and WO'502, gas atomized and centrifugally atomized in a protective atmosphere of 3.25% O_2.

Alloy composition (ppm)						Gas Atomization	Centrifugal Atomization
Al	Bi	Ca	Mg	Ni	Pb		
500	-	-	-	500	500	7,15	19,6
-	-	-	500	500	500	11,2	11,7
30	100	-	-	-	-	9,86	17,7
100	100	180	-	-	-	6,88	25,9

4. The partial discharge gassing test was taken from US 5,364,715. The data in the Table 2 below clearly show that the alloys covered by WO'502 are not acceptable to make a good zinc powder for alkaline battery by centrifugal atomization (customer specifications for volume expansion nowadays are below 8%), contrary to the results obtained for the present application.. Moreover, the data in the Table 2 also clearly show that compared to gas atomization at 3.25% O_2, the centrifugal atomization process does not improve the properties of the zinc powders, both for the alloys covered by WO'502 and JP'379, contrary to the results obtained for the present application.

Table 2: Volume expansion measurements (volume increase is expressed as a percentage of the original volume) for alloys taken from JP'379, and WO'502, gas atomized and centrifugally atomized in a protective atmosphere of 3.25% O_2.

Alloy composition (ppm)						Gas Atomization	Centrifugal Atomization
Al	Bi	Ca	Mg	Ni	Pb		
500	-	-	-	500	500	11,2	20,6
-	-	-	500	500	500	12,9	20,7
30	100	-	-	-	-	16,4	16,5
100	100	180	-	-	-	4,87	17,3

5. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application and any patent issuing thereon.

Date: July 7, 2005

Christophe Henninot